In re Patent Application of
CHAPPAZ
Serial No. **10/006,995**
Filed: **DECEMBER 3, 2001**

<u>**In the Specification:**</u>

Please replace the paragraph at page 3, line 26, with the following rewritten paragraph:

More precisely, when the transmission channel has an impulse response with L coefficients for example, and delivers successive digital samples corresponding to successively transmitted symbols each of which can take M different possible values, the estimation of the successive values of the symbols by using the Viterbi algorithm comprises a stage-by-stage progression through a trellis. All the states of all the stages are respectively provided with "aggregate metrics" according to a terminology well known to the person skilled in the art. These aggregate metrics are, for example, error [[cues]] <u>information</u> aggregated (e.g., calculated with the aid of a Euclidean norm) between the observed values and the expected values of the samples. This is on the basis of an assumption regarding the values of the symbols.

Please replace the paragraph at page 7, line 6, with the following rewritten paragraph:

The aggregate metrics may be error [[cues]] <u>information</u> aggregated between the observed values and the expected values of the samples. This may be on the basis of an assumption regarding the values of the symbols. In this case, according to a mode of implementation of the process according to the invention, in each group one of the transitions which leads to the state provided with a minimum aggregate metric is determined. Also, a unique decision is taken regarding the value of the symbol of rank n-k by

In re Patent Application of
CHAPPAZ
Serial No. **10/006,995**
Filed: **DECEMBER 3, 2001**

detecting the group associated with the smallest of these M minimum aggregate metrics. The unique decision is provided with a symbol-confidence index formulated from these M minimum aggregate metrics.

Please replace the paragraph at page 8, line 9, with the following rewritten paragraph:

As a variation, the aggregate metrics may be resemblance [[cues]] <u>information</u> aggregated between the observed values and the expected values of the samples. This may be on the basis of an assumption regarding the values of the symbols. In such a case, according to one implementation of the invention, in each group one of the transitions which leads to the state provided with a maximum aggregate metric is determined, and a unique decision is taken regarding the value of the symbol of rank n-k by detecting the group associated with the largest of these M maximum aggregate metrics. This unique decision is provided with a symbol-confidence index formulated from these M maximum aggregate metrics.

Please replace the paragraph at page 9, line 23, with the following rewritten paragraph:

Several variations are possible for formulating the bit-confidence index for a relevant bit of the elected symbol. According to a first variation, in which the aggregate metrics are error [[cues]] <u>information</u>, this formulation of the bit-confidence index for a relevant bit of the elected symbol comprises the following steps.

In re Patent Application of
CHAPPAZ
Serial No. **10/006,995**
Filed: **DECEMBER 3, 2001**

Please replace the paragraph at page 10, line 8, with the following rewritten paragraph:

According to a second variation of the invention, in which the aggregate metrics are error [[cues]] <u>information</u>, the formulation of the bit-confidence index for a relevant bit of the elected symbol comprises the following steps.

Please replace the paragraph at page 10, line 28, with the following rewritten paragraph:

According to another variation of the invention, in which the aggregate metrics are resemblance [[cues]] <u>information</u>, the formulation of the bit-confidence index for a relevant bit of the elected symbol comprises the following steps.

Please replace the paragraph at page 11, line 9, with the following rewritten paragraph:

According to yet another variation of the invention, in which the aggregate metrics are again resemblance [[cues]] <u>information</u>, the formulation of the bit-confidence index for a relevant bit of the elected symbol comprises the following steps.

Please replace the paragraph at page 13, line 27, with the following rewritten paragraph:

According to one embodiment, in which the aggregate metrics are error [[cues]] <u>information</u> aggregated between the observed values and the expected values of the samples (on the basis of an assumption regarding the values of the symbols),

In re Patent Application of
CHAPPAZ
Serial No. **10/006,995**
Filed: **DECEMBER 3, 2001**

the determination means is able to determine in each group one of the transitions which leads to the state provided with a minimum aggregate metric. The decision taking means is able to take a unique decision regarding the value of the symbol of rank n-k by detecting the group associated with the smallest of these M minimum aggregate metrics. The first formulation means is then able to formulate the symbol-confidence index from these M minimum aggregate metrics.

Please replace the paragraph at page 14, line 31, with the following rewritten paragraph:

According to one embodiment of the invention, in which the aggregate metrics are resemblance [[cues]] <u>information</u> aggregated between the observed values and the expected values of the samples (on the basis of an assumption regarding the values of the symbols), the determination means is able to determine in each group one of the transitions which leads to the state provided with a maximum aggregate metric. The decision taking means is able to take a unique decision regarding the value of the symbol of rank n-k by detecting the group associated with the largest of these M extremum aggregate metrics. Also, the first formulation means is able to formulate the symbol-confidence index from these M extremum aggregate metrics.

Please replace the paragraph at page 15, line 10, with the following rewritten paragraph:

When M is equal to 2, and the metrics are resemblance [[cues]] <u>information</u>, the decision taking means

advantageously comprises a subtractor able to calculate the difference between the two maximum aggregate metrics. The sign of this difference yields the unique decision regarding the value of the symbol of rank n-k. The first formulation means advantageously comprises the subtractor. The absolute value of the difference calculated by the subtractor yields the value of the symbol-confidence index.

Please replace the paragraph at page 15, line 20, with the following rewritten paragraph:

According to one embodiment of the invention, when M is greater than 2, and the metrics are resemblance [[cues]] <u>information</u>, the decision taking means comprises first selection means that is able to perform a first selection of the largest of these M maximum aggregate metrics. The first formulation means comprises second selection means that is able to perform a second selection, from among the M-1 remaining maximum aggregate metrics not selected on completion of the first selection, the largest of these M-1 remaining maximum aggregate metrics, and a subtractor able to calculate the difference between the two maximum aggregate metrics respectively arising from the first and from the second selections. The positive value of this difference yields the value of the symbol-confidence index.

Please replace the paragraph at page 16, line 10, with the following rewritten paragraph:

According to another embodiment of the invention, compatible with aggregate error [[cues]] <u>information</u> regarded

as aggregate metrics, the second formulation means comprises the following. Auxiliary formulation means that is able to formulate a single auxiliary symbol by complementing only the value of the relevant bit while leaving unchanged the values of the other bits of the elected symbol. Auxiliary selection means that is able to select the minimum aggregate metric associated with the group of transitions to which the auxiliary symbol belongs. An auxiliary subtractor is able to form the difference between the minimum aggregate metric associated with the group of transitions to which the elected symbol belongs, and the minimum aggregate metric associated with the group of transitions to which the auxiliary symbol belongs. The result of this difference yields the value of the bit-confidence index.

Please replace the paragraph at page 16, line 10, with the following rewritten paragraph:

According to another embodiment of the invention, compatible with aggregate error [[cues]] <u>information</u> regarded as aggregate metrics, the second formulation means comprises the following. Auxiliary formulation means that is able to formulate a single auxiliary symbol by complementing only the value of the relevant bit while leaving unchanged the values of the other bits of the elected symbol. Auxiliary selection means that is able to select the minimum aggregate metric associated with the group of transitions to which the auxiliary symbol belongs. An auxiliary subtractor is able to form the difference between the minimum aggregate metric associated with the group of transitions to which the elected

symbol belongs, and the minimum aggregate metric associated with the group of transitions to which the auxiliary symbol belongs. The result of this difference yields the value of the bit-confidence index.

Please replace the paragraph at page 16, line 10, with the following rewritten paragraph:

According to another embodiment of the invention, likewise compatible with aggregate error [[cues]] information regarded as aggregate metrics, the second formulation means comprises the following. Auxiliary formulation means is able to formulate a set of auxiliary symbols by complementing the value of the relevant bit and by conferring all the possible values on the other bits respectively of the elected symbol. First auxiliary selection means is able to select respectively the minimum aggregate metrics associated with the groups of transitions to which the auxiliary symbols respectively belong. Second auxiliary selection means is able to select the smallest of the minimum aggregate metrics respectively selected by the first auxiliary selection means. An auxiliary subtractor is able to form the difference between the minimum aggregate metric associated with the group of transitions to which the elected symbol belongs, and the minimum aggregate metric selected by the second auxiliary selection means. The result of this difference yields the value of the bit-confidence index.

Please replace the paragraph at page 17, line 15, with the following rewritten paragraph:

In re Patent Application of
CHAPPAZ
Serial No. **10/006,995**
Filed: **DECEMBER 3, 2001**

According to another embodiment of the invention, compatible with aggregate resemblance [[cues]] <u>information</u> regarded as aggregate metrics, the second formulation means comprises the following. Auxiliary formulation means is able to formulate a single auxiliary symbol by complementing only the value of the relevant bit while leaving unchanged the values of the other bits of the elected symbol. Auxiliary selection means is able to select the maximum aggregate metric associated with the group of transitions to which the auxiliary symbol belongs. An auxiliary subtractor is able to form the difference between the maximum aggregate metric associated with the group of transitions to which the elected symbol belongs, and the maximum aggregate metric associated with the group of transitions to which the auxiliary symbol belongs. The result of this difference yields the value of the bit-confidence index.

Please replace the paragraph at page 17, line 33, with the following rewritten paragraph:

According to another embodiment of the invention, likewise compatible with aggregate resemblance [[cues]] <u>information</u> regarded as aggregate metrics, the second formulation means comprises the following. Auxiliary formulation means is able to formulate a set of auxiliary symbols by complementing the value of the relevant bit and by conferring all the possible values on the other bits of the elected symbol. First auxiliary selection means is able to select respectively the maximum aggregate metrics associated with the groups of transitions to which the auxiliary symbols

In re Patent Application of
CHAPPAZ
Serial No. **10/006,995**
Filed: **DECEMBER 3, 2001**

respectively belong. Second auxiliary selection means is able to select the largest of the maximum aggregate metrics respectively selected by the first auxiliary selection means. An auxiliary subtractor is able to form the difference between the maximum aggregate metric associated with the group of transitions to which the elected symbol belongs, and the maximum aggregate metric selected by the second auxiliary selection means. The result of this difference yields the value of the bit-confidence index.

Please replace the paragraph at page 24, line 29, with the following rewritten paragraph:

Several possibilities are offered for determining the transition metrics MTR associated with the various transitions of the trellis. According to a first variation of the invention, the aggregate metrics may be error [[cues]] <u>information</u> aggregated between the observed values and the expected values of the samples (on the basis of an assumption regarding the values of the symbols). In this case, the transition metric or branch metric MTR_n can be a Euclidean metric such as that defined by formula (IV) below:

$$MTR_n = \left| r_n - \sum_{i+0}^{L-1} C_i S_{ni} \right|^2$$

According to another variation of the invention, the aggregate metrics may be resemblance [[cues]] <u>information</u> aggregated between the observed values and the expected values of the

In re Patent Application of
CHAPPAZ
Serial No. **10/006,995**
Filed: **DECEMBER 3, 2001**

samples (on the basis of an assumption regarding the values of the symbols). In this case, it is necessary to have at the input of the equalization block BEQ, a matched filter whose impulse response is equal to $H^*(z^{-1})$, with the notation "*" denoting the complex conjugate.